

Arizona Vaccine Preventable Disease Update

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Arizona Department of Health Services
Office of Infectious Disease Services



Health and Wellness for all Arizonans

azdhs.gov

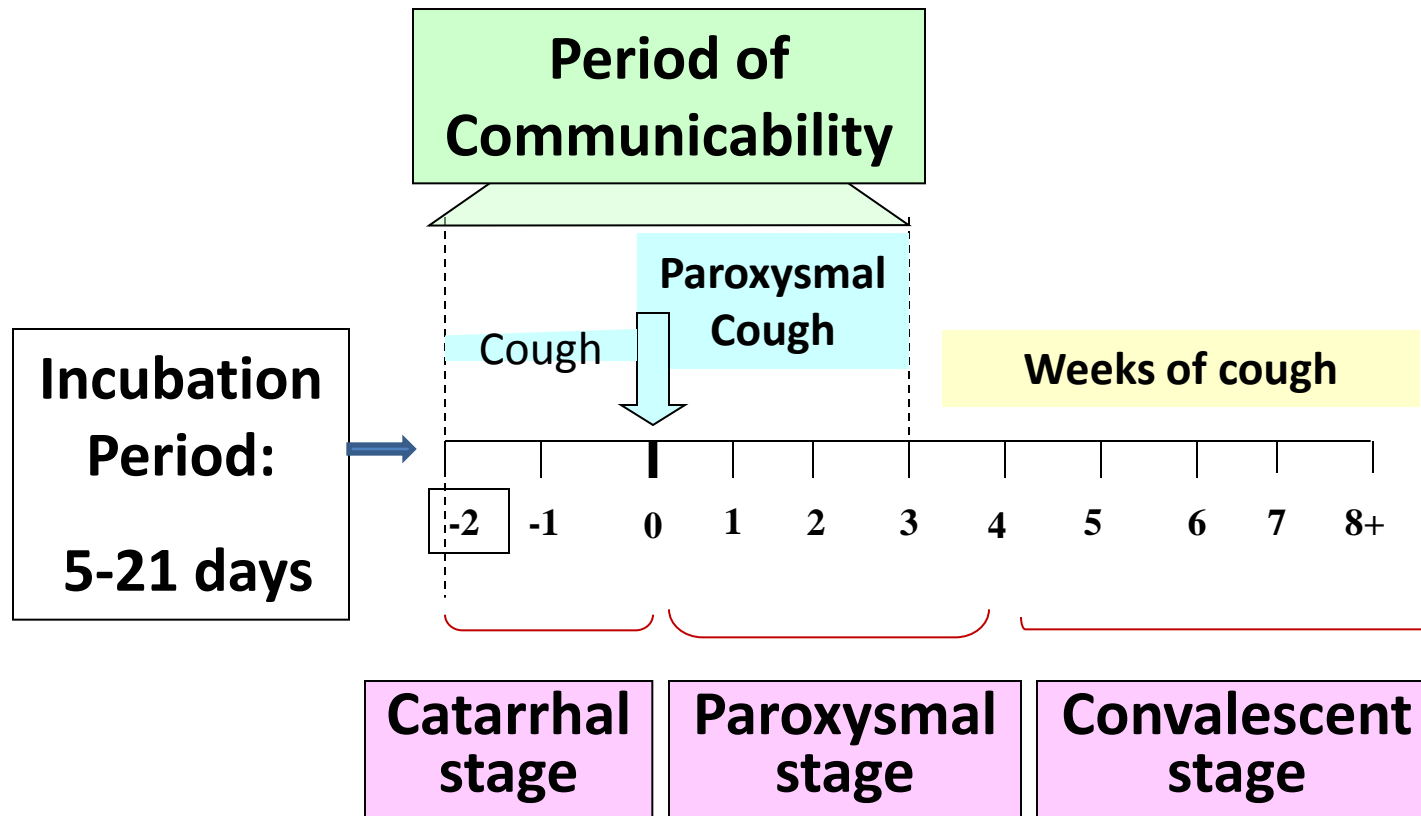


Selected Reportable Vaccine Preventable Diseases in Arizona

- Pertussis
- *Neisseria meningitidis*
- *Haemophilus influenzae*, type B
- Mumps
- Measles
- Hepatitis B
- Influenza

Pertussis

Clinical Course of Pertussis



Pertussis Epidemiologic Features

- Highly contagious, respiratory transmission
- Secondary transmission is common, secondary attack rates up to 80% among susceptible household contacts
- Patient is most infectious during catarrhal period and the first two weeks after cough onset

Unlikely to be Pertussis

- Fever
- Ill in between coughing
- Lots of nasal congestion
- Cough gets better over time
- Purulent secretions
- Cold symptoms but no known contact with pertussis

Suspect Pertussis

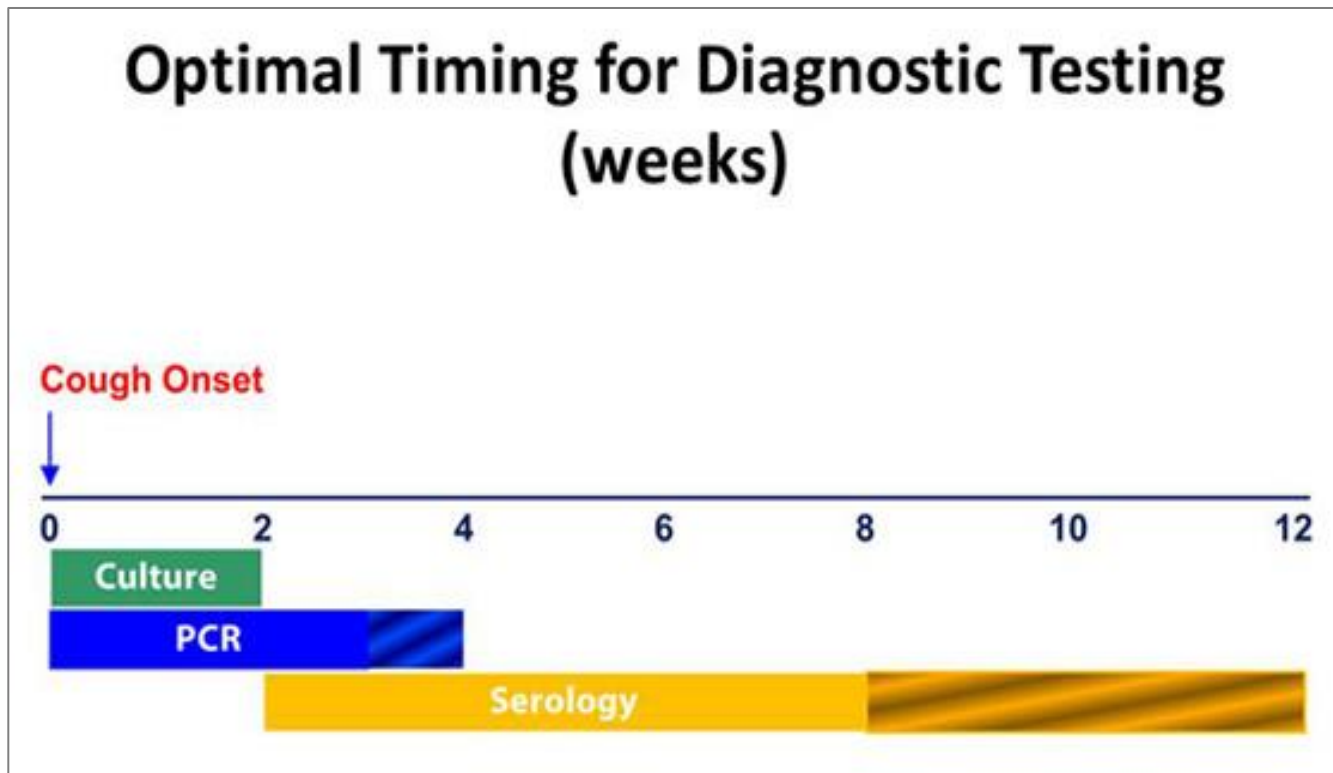
- Coughing
 - Worsens after mild “cold”
 - Increasingly severe
- Fine in between coughing
- No fever
- Normal physical examination
- Catching a “cold” after being around someone with pertussis

Precautions

- Droplet Isolation
 - 5 days with correct antibiotics
 - 21 days without antibiotics

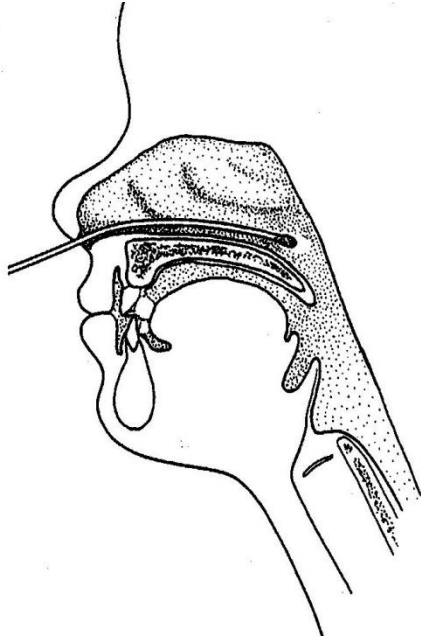


Pertussis Testing



<http://www.cdc.gov/pertussis/clinical/diagnostic-testing/diagnosis-confirmation.html>

Pertussis Laboratory Confirmation



Pertussis Clinical Case Definition

- Clinical Case Definition
 - A cough illness lasting at least 2 weeks with at least one of the following: paroxysms of coughing, inspiratory “whoop,” or post-tussive vomiting, without other apparent cause) as reported by a health professional
- Laboratory Criteria
 - Isolation of *Bordetella pertussis* from clinical specimen
 - PCR positive result for *B. pertussis*

Pertussis Clinical Case Definition

- Probable:
 - Case meets clinical case definition with no laboratory confirmation or epidemiologic linkage to a laboratory-confirmed case
- Confirmed:
 - Acute cough illness of any duration with isolation of *B. pertussis* from clinical specimen
 - Case meets clinical case definition and is positive on Pertussis PCR or has contact with a laboratory-confirmed case of pertussis

Pertussis Treatment and Prophylaxis

- **Azithromycin once a day for 5 days**
- Clarithromycin twice a day for 7 days
- Erythromycin 4 times a day for 14 days
 - Avoid in infants → risk of pyloric stenosis
- Alternate: Trimethoprim-sulfamethoxazole

Pertussis Postexposure Antibiotic Prophylaxis

- Focus on high risk contacts
 - Health care personnel in contact with patients
 - < 1 years old
 - Pregnant women
 - Household members and caretakers of infants
 - Child care workers
 - Children in day care where there are infants

Vaccination: DTaP

Routine DTaP Primary Vaccination Schedule

<u>Dose</u>	<u>Age</u>	<u>Minimum Interval</u>
Primary 1	2 months	---
Primary 2	4 months	4 weeks
Primary 3	6 months	4 weeks
Primary 4	15-18 months	6 months

5th dose: for all children who received all 4 primary doses before his/her 4th birthday, a 5th dose should be given before school entry

Vaccination: Tdap


- Adolescents 11-18 years
- Adults 19-64 years
- Children 7-10 years of age who are not fully vaccinated against pertussis
- Women during each pregnancy even if they've received it before , after 20 weeks gestation
- Adults 65 years and older who may have close contact with an infant

Pertussis Control Measures

- Exclusion of cases and symptomatic contacts from school/work settings through 5th day of antibiotic course
- If case is unwilling/unable to take antibiotics, they must be excluded for 21 days
- Assuring vaccinations are up-to-date (DtaP and Tdap)

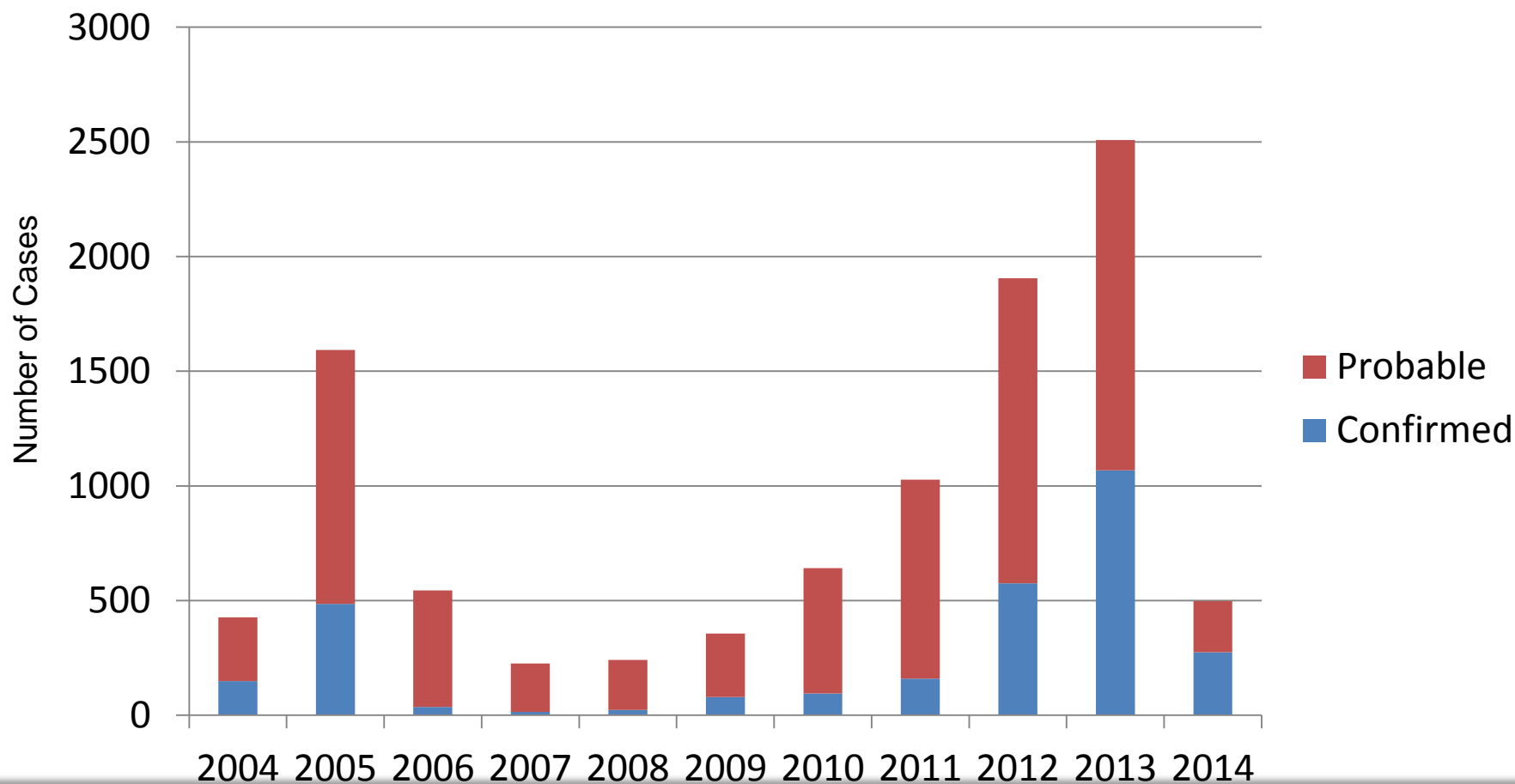
Reporting

Notify your local health department (or ADHS) as soon as pertussis is suspected and especially if testing is ordered

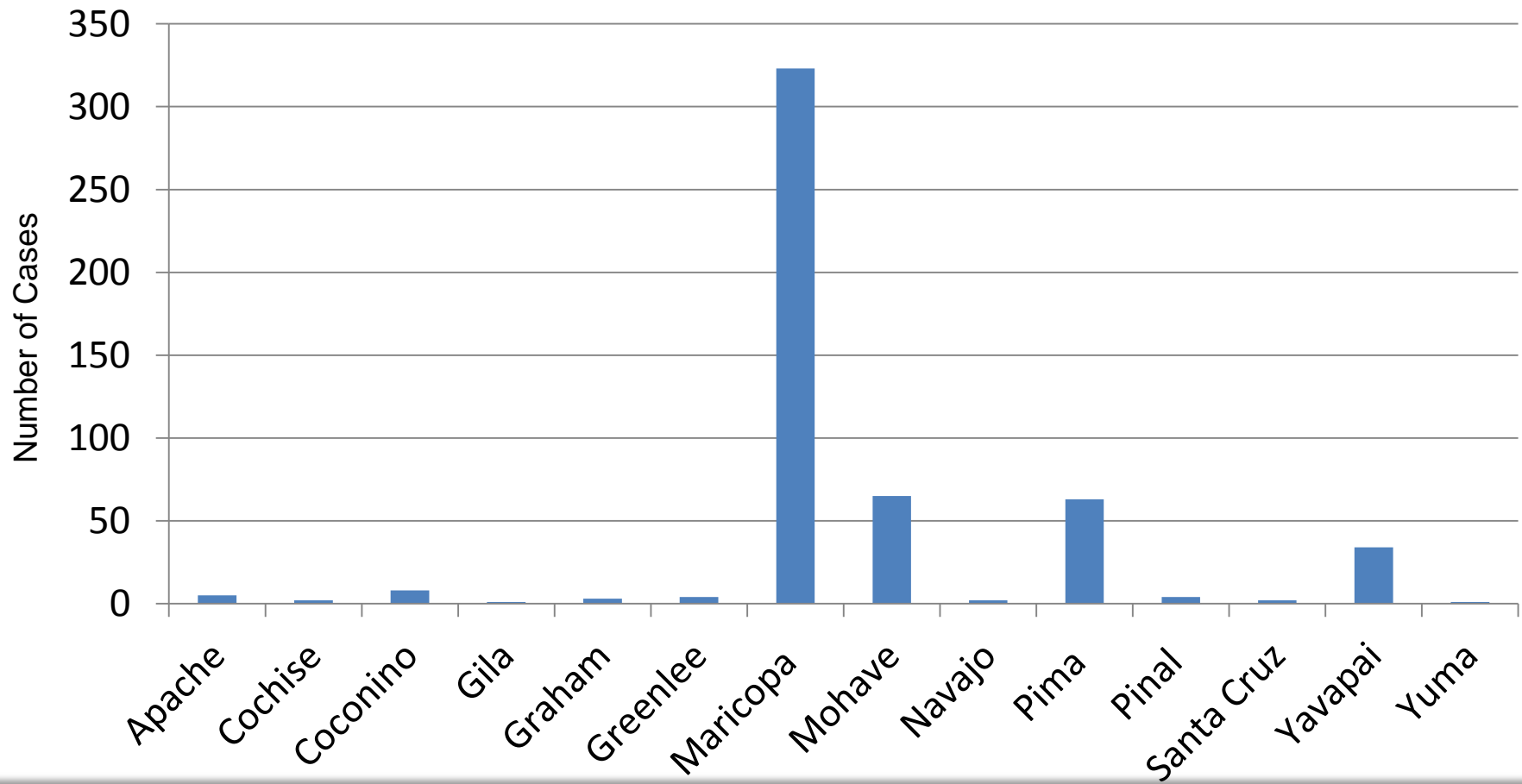
 Arizona Department of Health Services	Send or Fax to: ADHS Infectious Disease Epidemiology 150 North 18th Ave, Suite 140 Phoenix, Arizona 85007-3237 (602) 364-3199 Fax	ADHS Use Only:
	PERTUSSIS	
PATIENT INFORMATION		
MEDSIS Case No: _____	NAME (Last, First) _____	
County: _____	Street Address _____	
<input type="checkbox"/> Suspected <input type="checkbox"/> LTFU <input type="checkbox"/> Confirmed <input type="checkbox"/> Ruled Out <input type="checkbox"/> Probable	City _____ State _____ Zip _____	
	Mailing Address _____	
	Phone _____ Alt. Phone _____	
	Occupation/School Grade: _____	
	Employer/School/Other: _____	
	Alt. Contact _____ Phone _____	
	<input type="checkbox"/> Parent/Guardian <input type="checkbox"/> Spouse <input type="checkbox"/> Other _____	
	Birthdate ____/____/____ or Age ____ Sex: <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unknown/Other	
	Ethnicity: <input type="checkbox"/> Hispanic <input type="checkbox"/> Non-Hispanic <input type="checkbox"/> Unknown	
	Race: <input type="checkbox"/> White <input type="checkbox"/> African American <input type="checkbox"/> Native Hawaiian/Pacific Islander	
	<input type="checkbox"/> Asian <input type="checkbox"/> Am Indian/AK Native <input type="checkbox"/> Other _____	
REPORT SOURCE		
Initial Report Date: _____		
Reporter Name: _____		
Reporter Org.: _____		
Reporter Phone: _____		
Provider Name: _____		
Provider Org.: _____		
Provider Phone: _____		
CLINICAL		
Onset Date: ____/____/____ <input type="checkbox"/> Unknown	Diagnosis Date: ____/____/____	Illness Duration: ____ days <input type="checkbox"/> Ongoing
X _____ Signs and Symptoms		
Laboratory Results		

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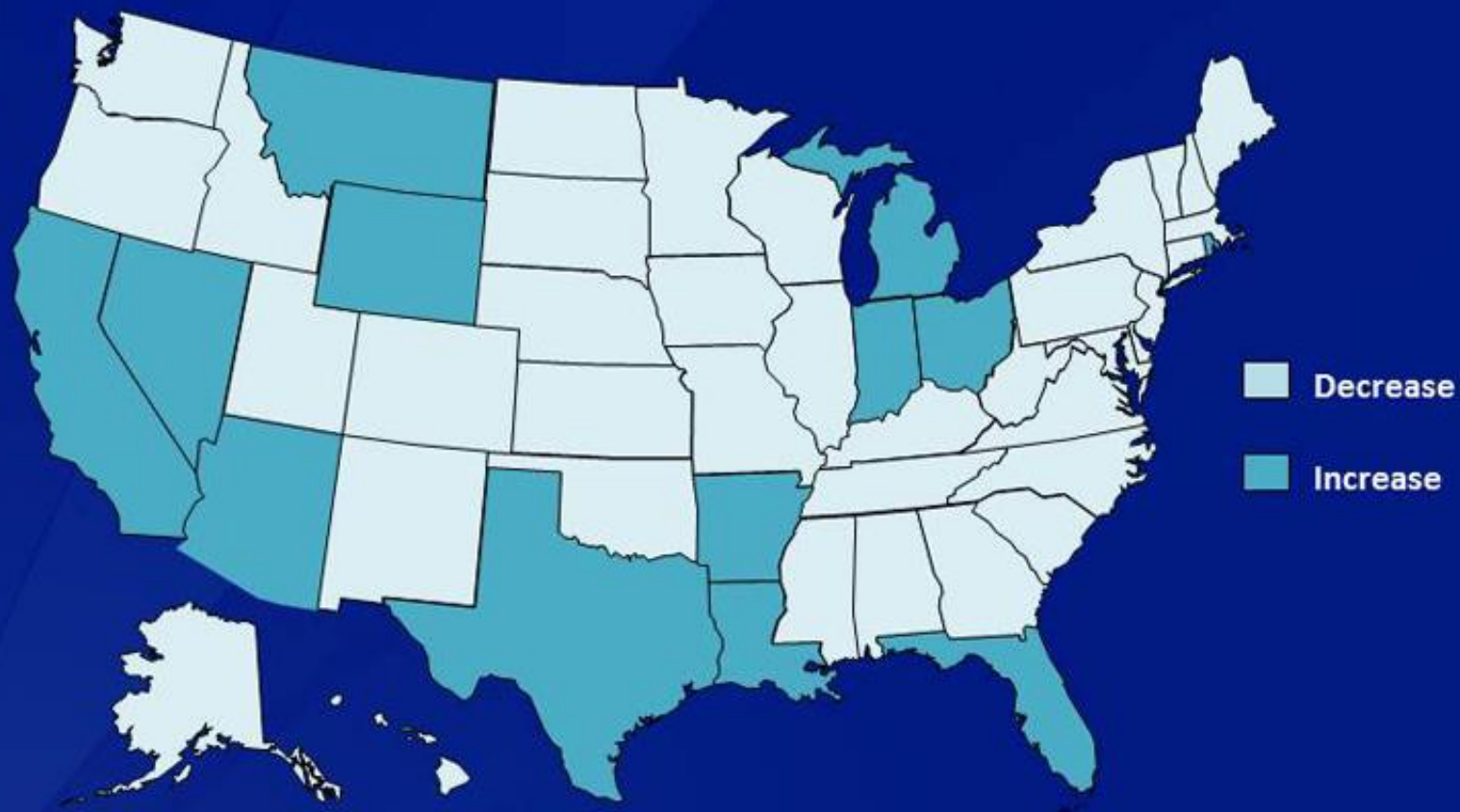
Pertussis in Arizona (2004-2014)



Reported Pertussis Cases (Confirmed and Probable), Arizona, 2014



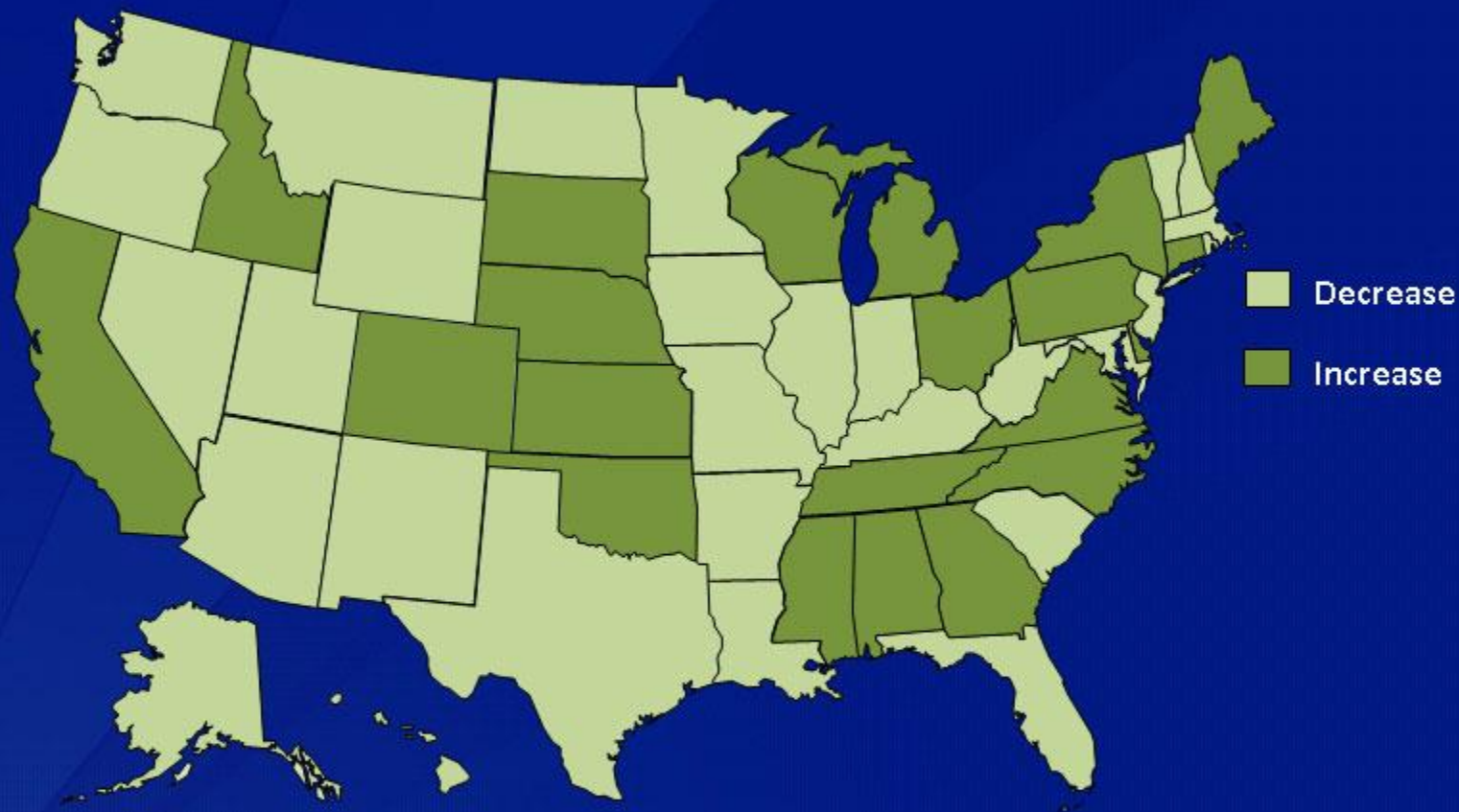
Changes in Pertussis Reporting by State from 2012 to 2013* †



*Data for 2013 are provisional and subject to change. †Cases reported through Week 52 in 2012 were compared with cases reported through Week 52 in 2013.



Changes in Pertussis Reporting by State from 2013 to 2014* †



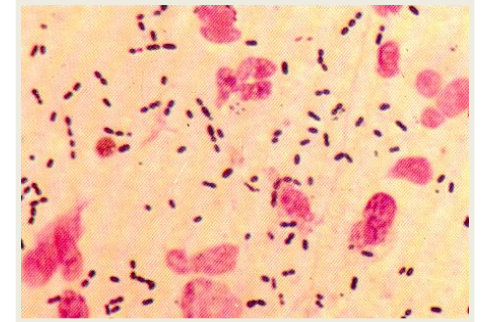
*Data for 2014 are provisional and subject to change. †Cases reported through Week 52 in 2013 were compared with cases reported through Week 53 in 2014.



Invasive Meningococcal Disease

Invasive Meningococcal Disease

- Gram-negative diplococcus
- Serogroups A, B, C, Y, & W-135 are those most commonly associated with systemic disease
- Transmission
 - person-to-person; direct contact with nasopharyngeal secretions or through droplets/saliva
- Incubation period: 1-10 days (usually 2-4)



Invasive Meningococcal Disease



- Symptoms of meningitis
 - Sudden onset of a stiff neck, high fever, and headache
 - Nausea, vomiting, and mental confusion often present
 - Petechial rash may be present
- Symptoms of meningococemia
 - Abrupt onset of fever, chills, malaise, prostration, and rash

Meningococcal Case Definition

- Confirmed
 - Isolation of *Neisseria meningitidis* from a normally sterile site (e.g., blood or CSF or, less commonly, synovial, pleural, or pericardial fluid) or from purpuric lesions
 - Detection of *N. meningitidis*-specific nucleic acid in a specimen obtained from a normally sterile body site, using a validated polymerase chain reaction (PCR) assay.

Meningococcal Case Definition

- Probable
 - Detection of *N. meningitidis* antigen
 - In formalin –fixed tissues by immunohistochemistry (IHC) OR
 - In CSF by latex agglutination
- Suspected
 - Clinical purpura fulminans in the absence of a positive blood culture; or
 - Gram-negative diplococci, not yet identified, isolated from a normally sterile body site (e.g., blood or CSF) *

Suspected Invasive Meningococcal Disease

- For suspected cases with gram stain showing presence of gram-negative diplococci from sterile site:
 - Treat as meningococcal case in regards to patient and contact investigation/chemoprophylaxis
 - Labs required to submit isolates for serogrouping at the state laboratory (clinical specimens not tested)

Meningococcal Postexposure Antibiotic Prophylaxis

- For contacts exposed directly to pt's oral secretions (i.e., kissing, sharing toothbrushes or eating utensils, preschool or childcare contacts, household members)
- Antibiotics used for chemoprophylaxis:
 - Rifampin (two day course)
 - Ceftriaxone (single dose IM)
 - Ciprofloxacin (single dose)
 - Azithromycin (single dose, not recommended routinely)

N. Meningitidis ACWY Vaccines

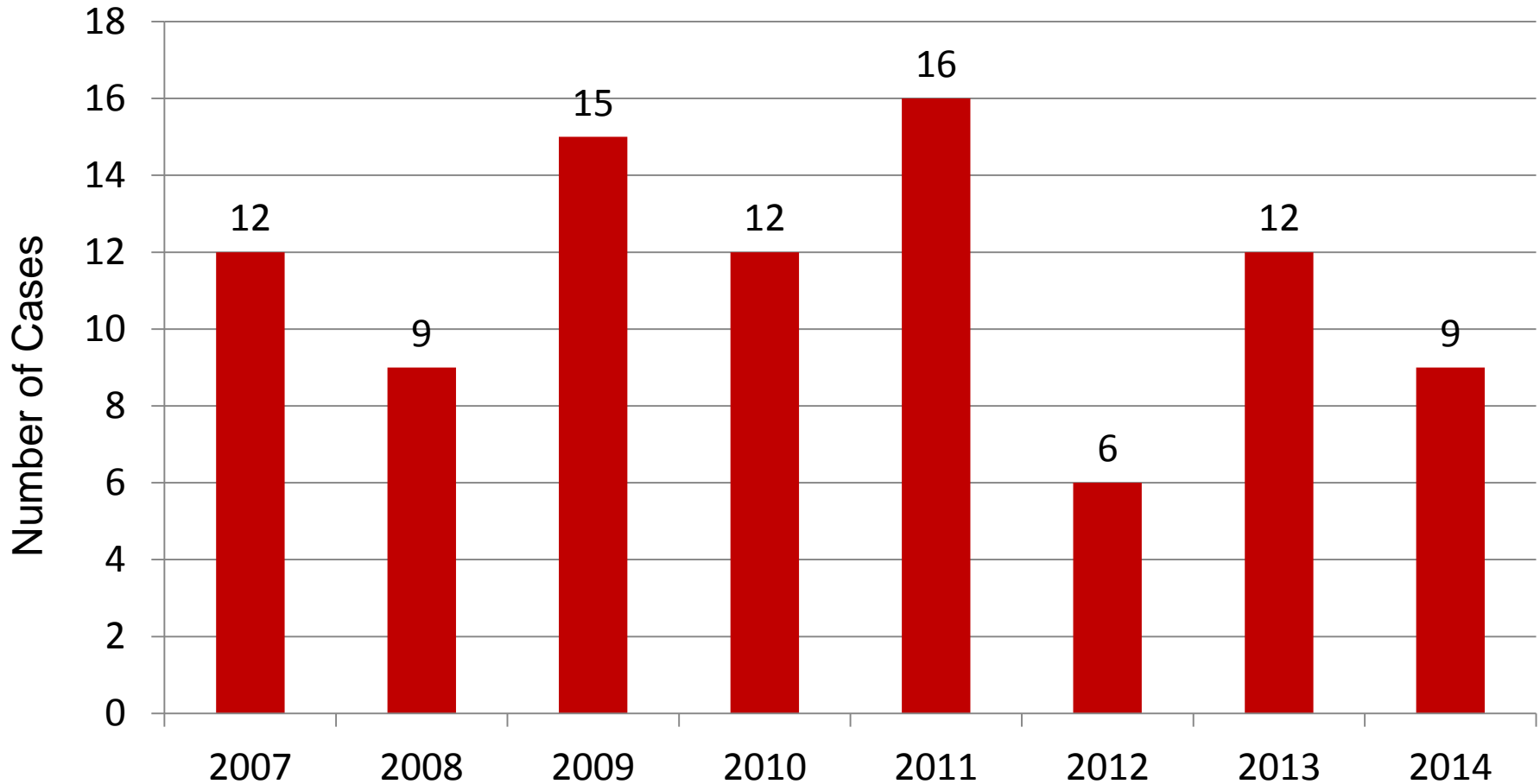
- 2 Conjugate (MCV4) and 1 Polysaccharide (MPSV4)
 - 1st conjugate vaccine licensed in 2005
 - Conjugate vaccines currently approved for ages 2 – 55
 - Polysaccharide vaccine licensed for ages 2 and older
 - Immune response not as strong as conjugate vaccine
- Protects against serogroups A, C, Y, and W-135
 - Recommended for all children 11 – 12 years of age with a booster dose at 16 years of age
 - College freshmen living in dormitories
 - Special recommendations for persons at particular risk
- For 2014-2015 school year in AZ, all 6-12th graders are required to receive 1st dose of MCV4 before school entry

N. Meningitidis Serogroup B Vaccines

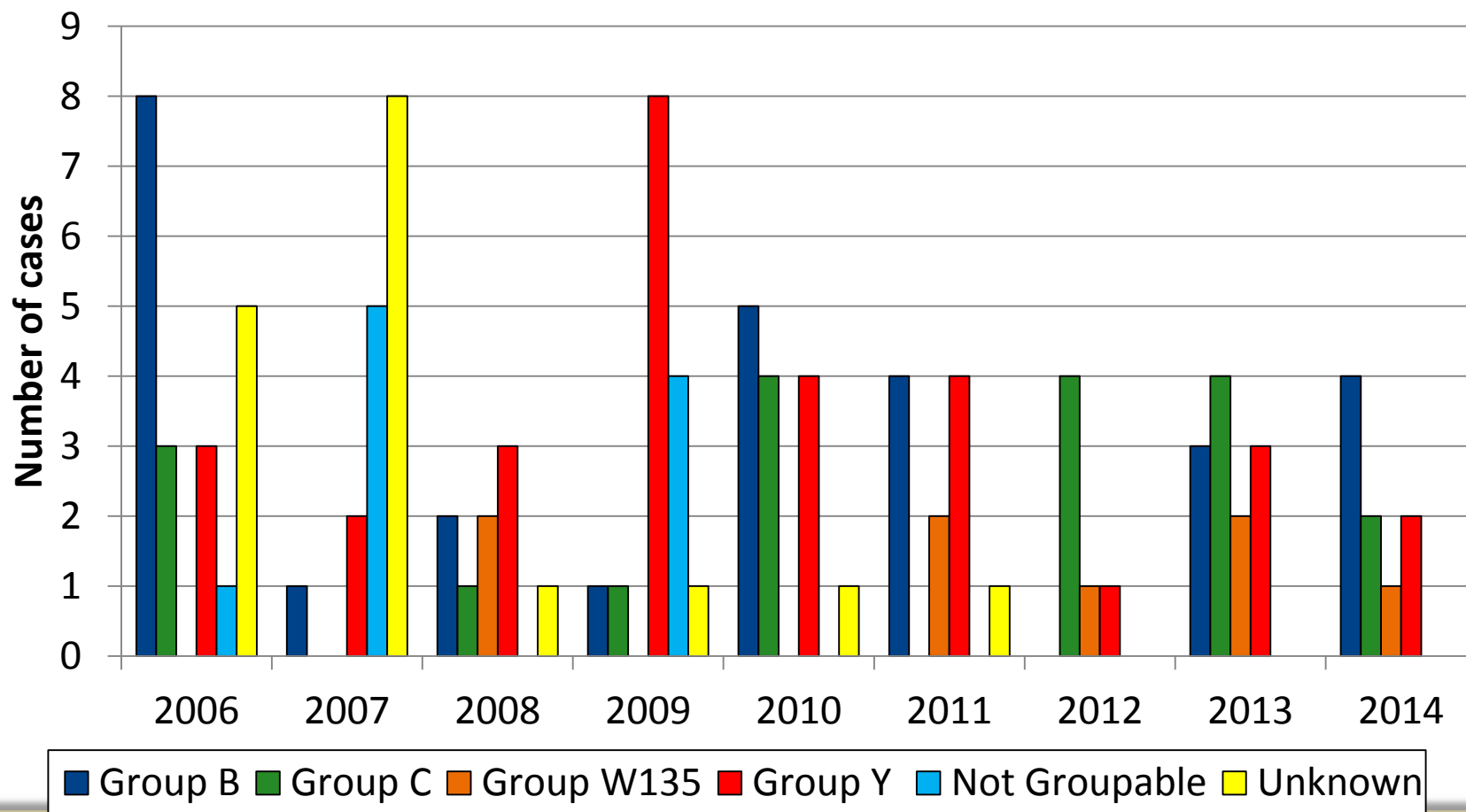
- Trumenba (Wyeth)
 - Licensed October 29, 2014
 - Licensed for individuals 10-25 years of age, 3 dose series
- Bexsero (Novartis)
 - Licensed January 23, 2015
 - Licensed for individuals 10-25 years of age, 2 dose series
- Recommendations for use of MenB vaccine in organizational settings:
<http://www.cdc.gov/meningococcal/downloads/interim-guidance.pdf>
- Recommendations for the use of serogroup B vaccines in the general population are forthcoming

Invasive Meningococcal Disease

Arizona, 2009-2014



N. meningitidis Serogroup Breakdown 2006-2014 Cases



Meningococcal Invasive Disease

2014 (preliminary)

9 confirmed cases

4 serogroup B
2 serogroup C
2 serogroup Y
1 serogroup W-135

3 deaths:

- 50 y.o.
(serogroup B)
- 40 y.o.
(serogroup C)
- 15 mos.
(serogroup B)

2013

12 confirmed cases

3 serogroup B
4 serogroup C
3 serogroup Y
2 serogroup W-135

3 deaths:

- 55 y.o.
(serogroup B)
- 42 y.o.
(serogroup W135)
- 93 y.o.
(serogroup C)

2012

6 confirmed cases

4 serogroup C
1 serogroup Y
1 serogroup W-135

1 death:

- 59 y.o.
(serogroup W135)

Meningococcal Invasive Disease

University Serogroup B Outbreaks

- Princeton University
 - Eight cases reported since March 2013
 - One additional outbreak related case at Drexel University
 - The last outbreak associated case was March, 2014
 - Serogroup B meningococcal vaccine (Bexsero[®], licensed for use in Europe, Canada, and Australia used under an Investigational New Drug application
 - Since December 2013, more than 13,000 doses of the vaccine were administered at Princeton University with no unusual adverse events reported

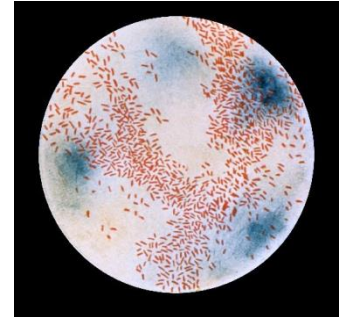
Meningococcal Invasive Disease University Serogroup B Outbreaks

- University of California Santa Barbara
 - Four confirmed cases reported
 - Serogroup B meningococcal vaccine (Bexsero[®], licensed for use in Europe, Canada, and Australia) used under an Investigational New Drug application
 - More than 17,000 doses administered with no unusual adverse events reported

Haemophilus influenzae type b

Haemophilus influenzae invasive

- Gram negative coccobacillus
 - Two types
 - Encapsulated (6 types designated 'A' through 'F')
 - Not encapsulated ('non-typable')
 - Type b the most likely to cause severe disease in children < 5
- All invasive infections are reportable to ADHS
 - Labs required to submit isolates for serotyping at the state laboratory



Haemophilus influenzae, type b

- Prior to vaccine availability, was a major cause of bacterial meningitis in children under 5 years of age
- Mode of transmission thought to be through respiratory droplets
 - Humans are main reservoir for the organism
 - Hib does not survive in the environment on inanimate surfaces
 - Secondary infections are rare
 - Secondary attack rates estimated between 0 – 2.7%
- Non-encapsulated (non-typable) disease typically less virulent
 - No recommended public health intervention for non-type b infections

Vaccination: Hib

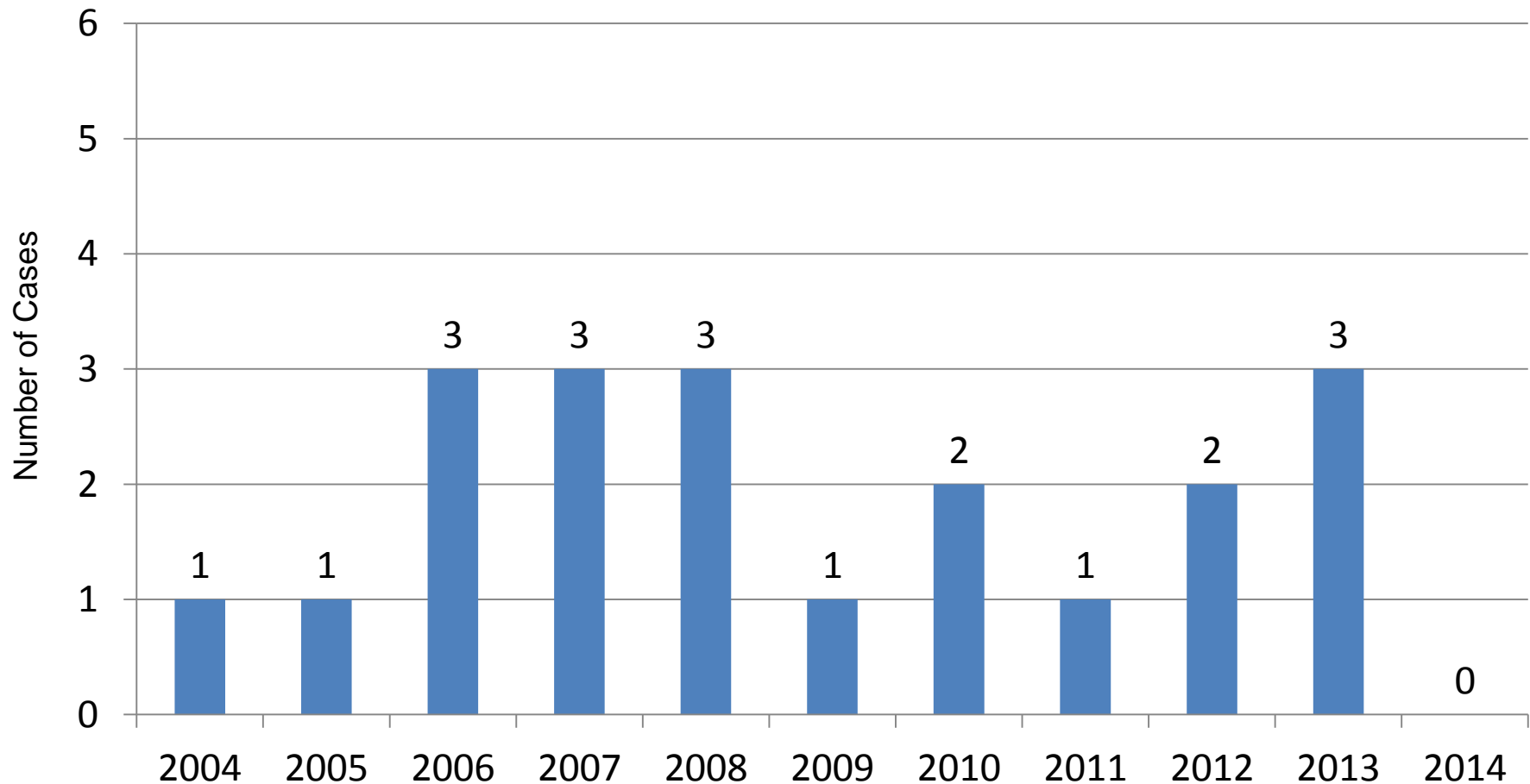
Vaccine	2 Months	4 Months	6 Months	12-15 Months
PRP-T*	Dose 1	Dose 2	Dose 3	Booster
PRP-OMP	Dose 1	Dose 2		Booster

Haemophilus influenzae

Clinical Case Definition

- Confirmed
 - Isolation of *H. influenzae* from a normally sterile body site (e.g., cerebrospinal fluid (CSF), blood, joint fluid, pleural fluid, pericardial fluid), or
 - Detection of *Haemophilus influenzae*-specific nucleic acid in a specimen obtained from a normally sterile body site, using a validated polymerase chain reaction (PCR) assay
- Probable
 - Meningitis with detection of *Haemophilus influenzae* type b antigen in CSF

Invasive *Haemophilus influenzae* b < 5 years, Arizona, 2004-2013



H. flu type B (Hib) in children <5 years

2014

No cases

2013

3 confirmed cases

- 1 death in an unvaccinated

- 1 year old (bacteremia and meningitis)

Measles

Measles

- Highly infectious viral disease
- Airborne transmission
- Virus can remain in air for hours
- Communicability: 4 days before until 4 days after rash onset
- Incubation Period: 7–18 days
- Clinical features
 - Prodrome of fever (typically 103°F or higher) and “Three C’s” (coryza, conjunctivitis, cough)
 - Maculopapular rash



Measles Rash

- Maculopapular, appears 2-4 days after prodrome
- Begins on face and head and moves down body
- Becomes confluent
- Fades in order of appearance
- Lasts 5-6 days



Measles Laboratory Testing

- Specimens to collect are serum, nasopharyngeal swab, and urine
 - Serum for Measles IgM antibody testing
 - Nasopharyngeal swab and urine for PCR testing
- Nasopharyngeal swab and urine are best obtained within 7 days of rash onset (closer to onset is always better for PCR)
- Serum best at least 3 days after onset
- PCR testing important
 - Allows for confirmation of the presence of measles virus
 - Genotyping available at CDC to confirm virus origin

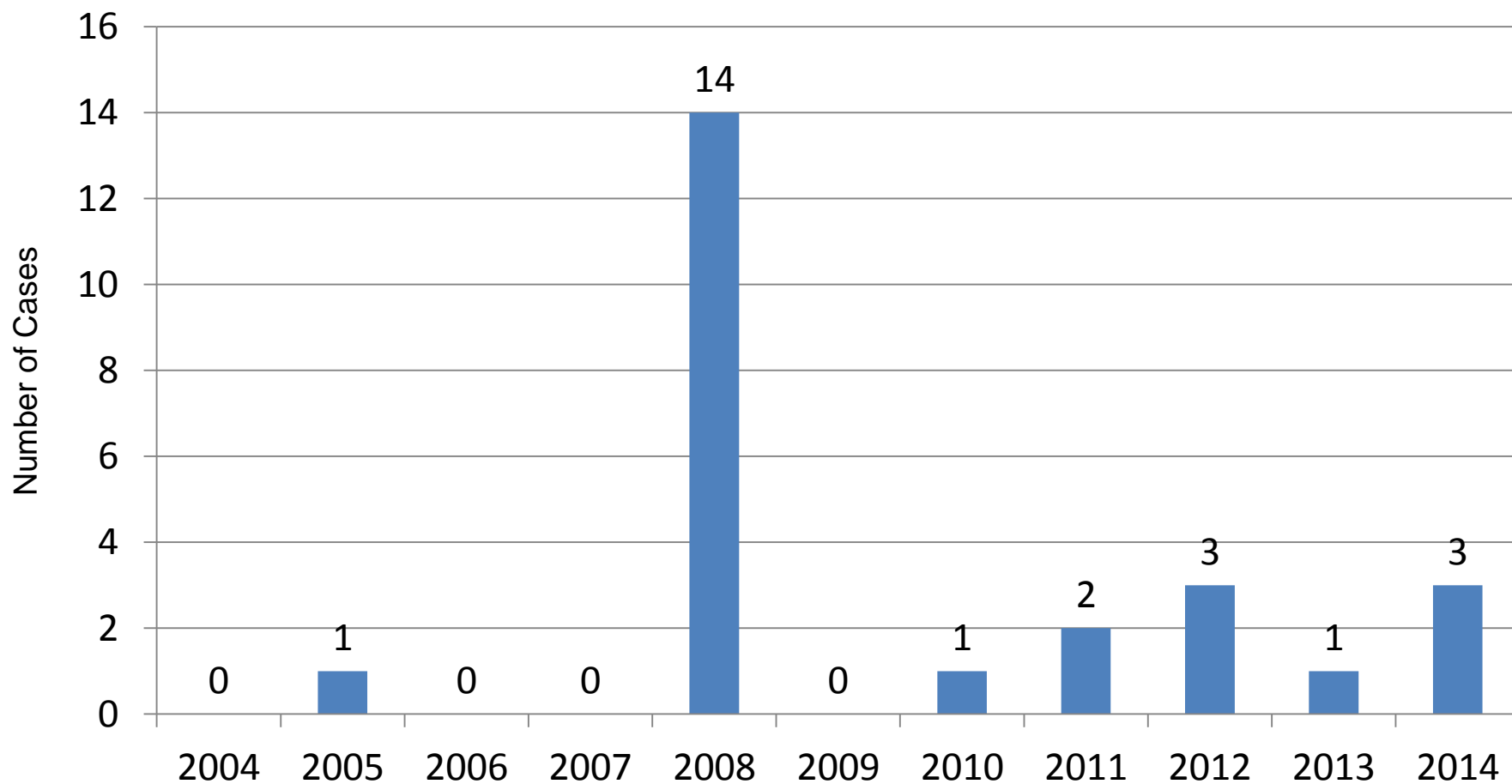
Measles Clinical Case Definition

- An illness characterized by:
 - A generalized rash lasting greater or equal to 3 days
 - A temperature greater or equal to 101.0° F
 - Cough, coryza, or conjunctivitis
- Laboratory criteria for diagnosis
 - Isolation of measles virus from a clinical specimen
 - Detection of measles virus-specific nucleic acid by polymerase chain reaction
 - Significant rise in serum measles immunoglobulin G antibody level between acute- and convalescent-phase specimens, by any standard serologic assay
 - Positive serologic test for measles immunoglobulin M antibody

Measles Case Classification

- Suspected
 - Any febrile illness accompanied by rash
- Probable
 - A case that meets the clinical case definition, has noncontributory or no serologic or virologic testing, and is not epidemiologically linked to a confirmed case
- Confirmed
 - A case that is laboratory confirmed or that meets the CCD and is epi-linked to a confirmed case

Measles, Confirmed Cases, Arizona, 2004-2014



2014 Measles Exposure

Maricopa County

- Confirmed measles case in unvaccinated out-of-state resident who visited Maricopa County during infectious period
- Case had recent travel history to Europe
- Case was confirmed as measles by PCR
- Potential exposures sites included an airport, a church, and a bakery/restaurant
- Maricopa County issued a press release and notified providers of potential exposures

2014 Measles Cases, Maricopa County

- December 2014
 - Three unvaccinated cases
 - Cases occurred in family members (mother and two children)
 - Exposure out of state (not Disneyland)
 - Classic measles symptoms
 - No spread



News Release

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH

FOR IMMEDIATE RELEASE

January 21, 2015
PH15-008

CONTACT: Anita Gore
(916) 440-7259

**California Department of Public Health
Confirms 59 Cases of Measles**

Dr. Ron Chapman, director of the California Department of Public Health (CDPH) and state health officer, announced today that local public health officials have confirmed a total of 59 cases of measles in California residents since the end of December 2014.

"If you have symptoms, and believe you may have been exposed, please contact your health care provider. Unless you have an emergency, it is best to contact your health care provider by phone to prevent spread in doctor's offices," said Chapman. "The best way to prevent measles and its spread is to get vaccinated."

Of the confirmed cases, 42 have been linked to an initial exposure in December at Disneyland or Disney California Adventure Park in Anaheim, California. The confirmed cases include five Disney employees. In addition, other cases have visited Disney parks while infectious in January. CDPH recommends that any patient with a measles compatible illness who has recently visited venues where international travelers congregate, such as theme parks, airports, etc., be considered to have a plausible exposure to measles.

Measles is a highly infectious, airborne disease that typically begins with fever, cough, runny nose and red eyes, and within a few days a red rash appears, usually first on the face and then spreading downward to the rest of the body.

Vaccination is the most important strategy to prevent measles. Two doses of measles-containing vaccine (MMR vaccine) are more than 99 percent effective in preventing measles. Measles vaccines have been available in the United States since 1963, and two doses have been recommended since 1989. If you are unsure of your vaccination status, check with your doctor to have a test to check for measles immunity or to receive vaccination.



Health and Wellness for all Arizonans

azdhs.gov

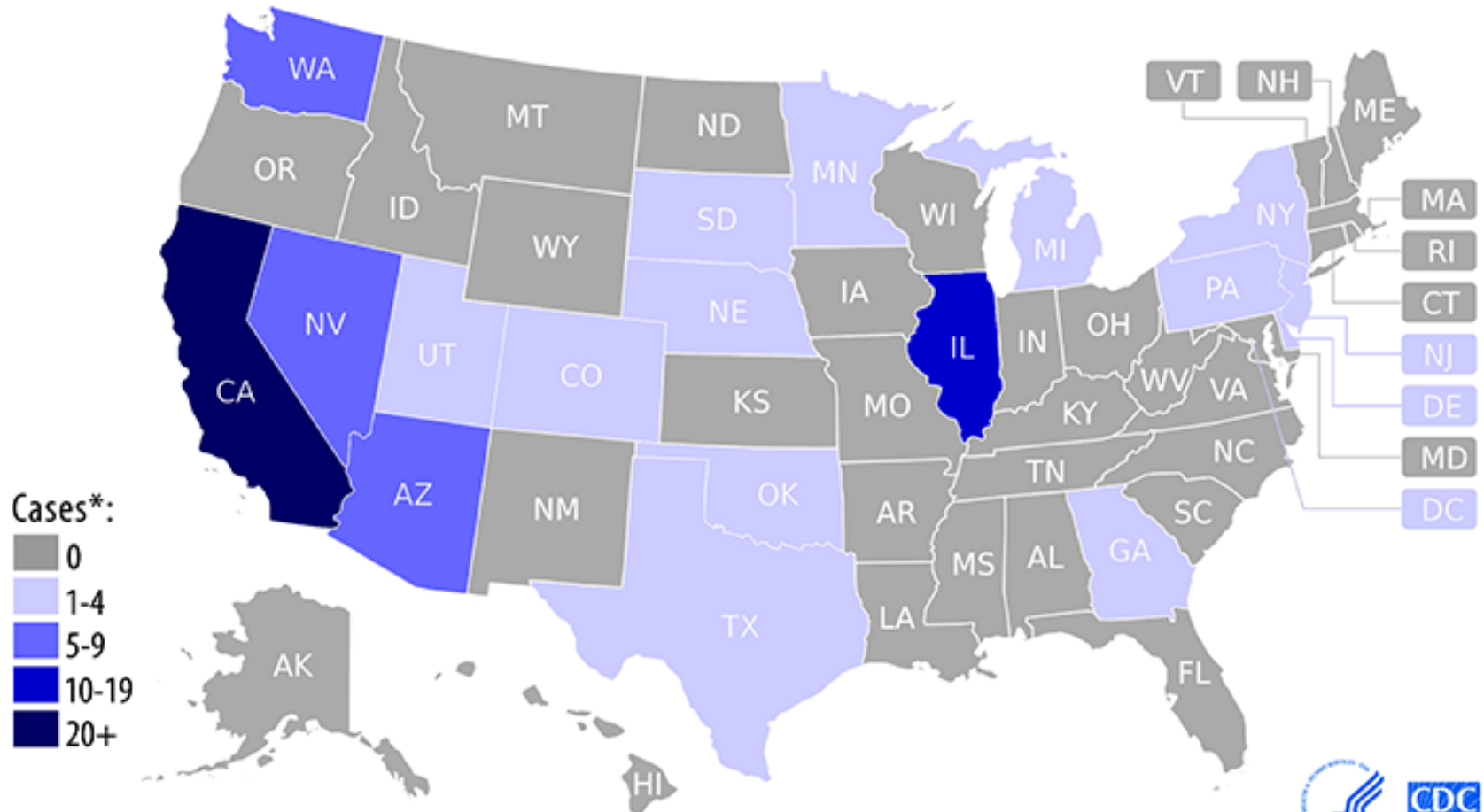


Arizona Measles Outbreak, 2015

- Maricopa County
 - 56 year old, unvaccinated, travel history to Disneyland, classic measles symptoms
 - 48 year old, history of 2 MMRs, exposed to a case
- Pinal County
 - Five unvaccinated cases
 - Cases occurred in family members
 - Classic measles symptoms
- Outbreak declared over 3/5/2015 with 7 cases

2015 Measles Cases in the U.S.

January 1 to April 10, 2015



*Provisional data reported to CDC's National Center for Immunization and Respiratory Diseases



Measles Cases and Outbreaks

January 1 to April 10, 2015*

159

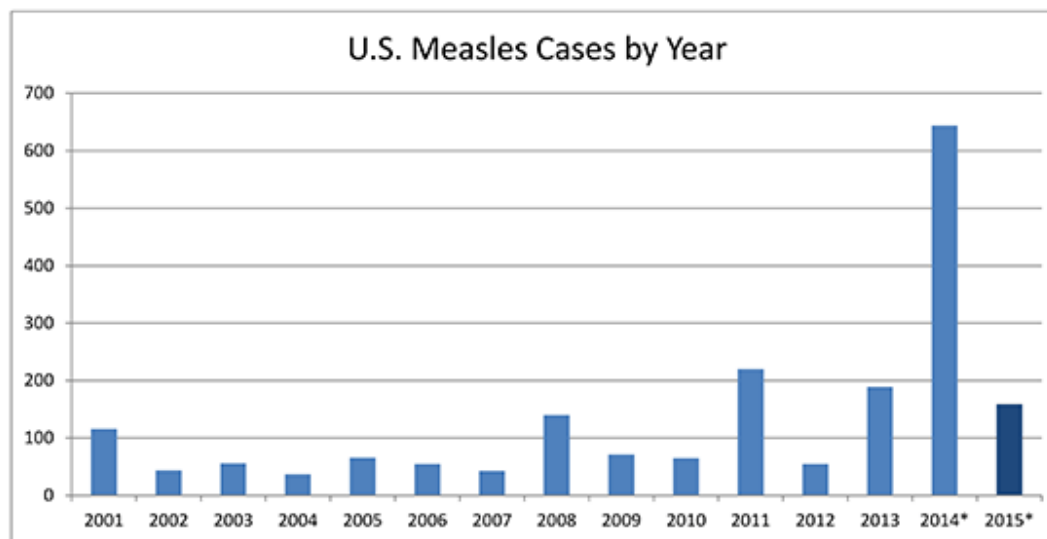
Cases

reported in 18 states and the District of Columbia: Arizona, California, Colorado, Delaware, Georgia, Illinois, Michigan, Minnesota, Nebraska, New Jersey, New York, Nevada, Oklahoma, Pennsylvania, South Dakota, Texas, Utah, Washington

4

Outbreaks

representing 91% of reported cases this year



*Provisional data reported to CDC's National Center for Immunization and Respiratory Diseases



Mumps

Mumps



- Viral illness
- Respiratory transmission
- Communicability thought to be similar to that of influenza and rubella
- Infective period from 2-3 days before onset of parotitis to 4 to 5 days after onset
- Nonspecific prodrome of myalgia, anorexia, malaise, headache, low-grade fever
- Parotitis occurs in 30-40% of infected persons, may be unilateral or bilateral
- Symptoms tend to decrease after one week

Mumps Laboratory Testing

- Specimens for laboratory testing important
 - Buccal and oropharyngeal swabs
 - For PCR and viral culture
 - CDC particularly interested in testing isolated cases
 - Ideally collected within 1 to 3 days after the onset of symptoms
 - Serum
 - IgM testing
 - Collected at same time as viral specimens
 - IgM rise may be delayed in vaccinated populations

Laboratory Criteria for Mumps Diagnosis

- Isolation of mumps virus from clinical specimen
- Detection of mumps nucleic acid on mumps PCR
- Detection of mumps IgM antibody
- Significant rise in serum mumps IgG antibody level between acute- and convalescent-phase specimens, by any standard serologic assay

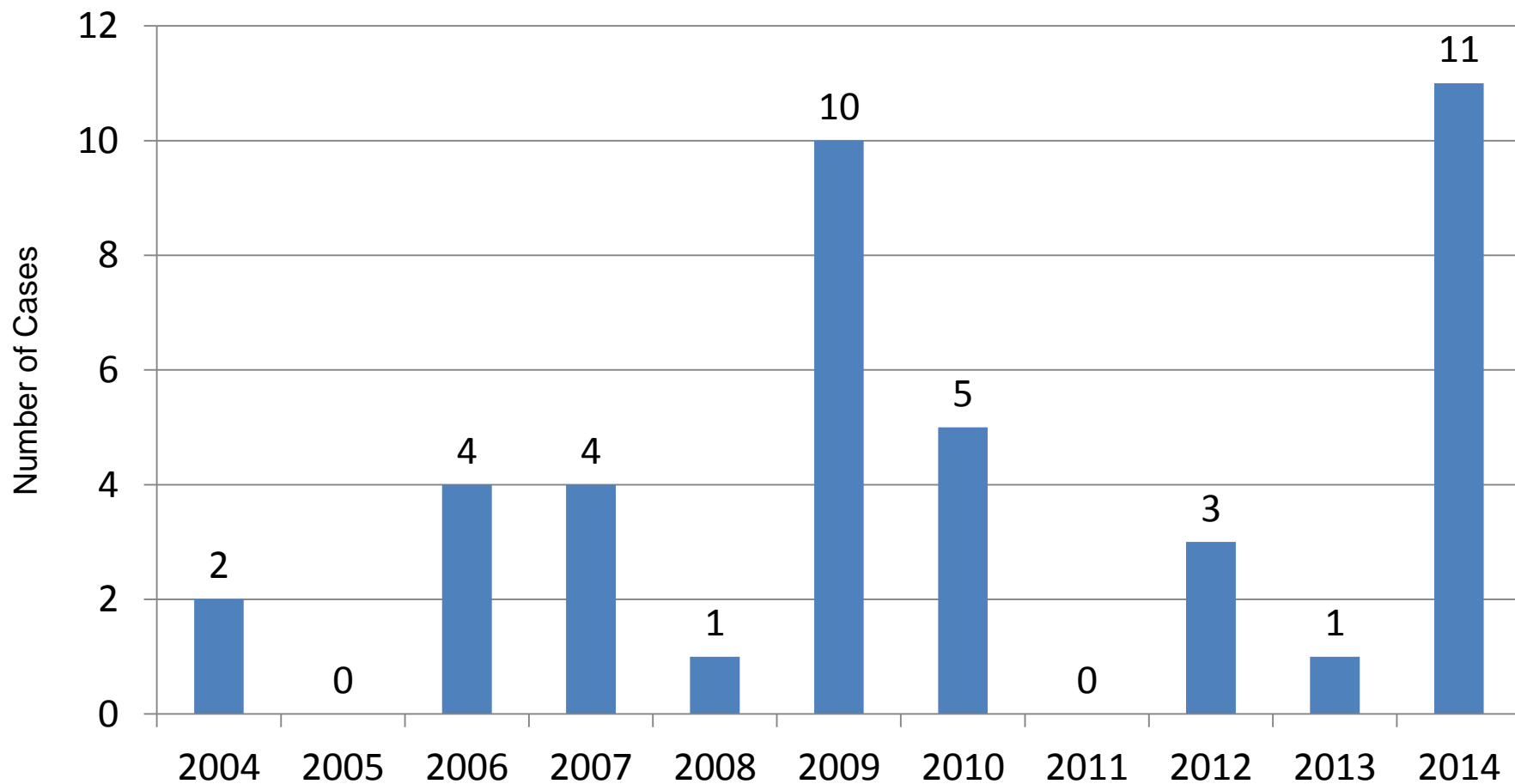
Mumps Clinical Case Definition

- An illness with acute onset of unilateral or bilateral tender, self-limited swelling of the parotid and/or other salivary gland(s), lasting at least 2 days, without other apparent cause.
- Infection may present as aseptic meningitis, encephalitis, hearing loss, orchitis, oophoritis, parotitis, or other salivary gland swelling, mastitis, or pancreatitis

Mumps Surveillance Case Definition

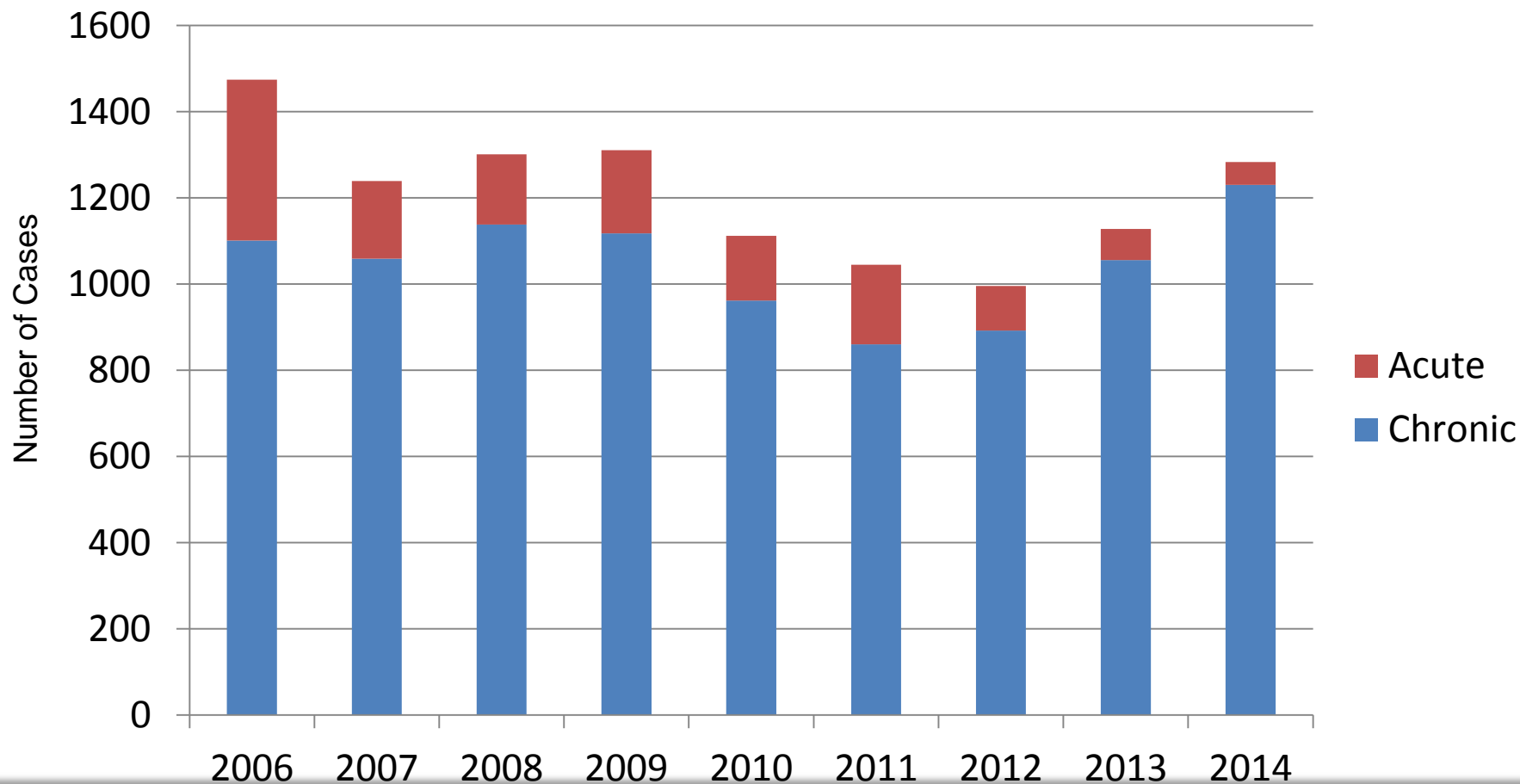
- **Confirmed:** A case that meets the clinical case definition or has clinically compatible illness AND is either lab confirmed or epi-linked to a confirmed case
- **Probable:** A case that meets the clinical case definition without laboratory confirmation and is epi-linked to a clinically compatible case.
- **Suspect:** A case with clinically compatible illness or that meets the clinical case definition without lab testing, or a case with lab tests suggestive of mumps without clinical information.

Confirmed Mumps, Arizona, 2004-2013



Hepatitis B

Hepatitis B, Acute and Chronic 2006-2014



Perinatal Hepatitis B

- Hepatitis B Vaccine for all infants preferably within 24 hours (or before hospital discharge)
- For mothers that have Hepatitis B, HBV and HBIG recommended for the infant within 12 hours of birth
- For mothers with unknown status, mothers should be tested and infant should receive first dose of HBV within 12 hours of birth. If mother tests positive for Hepatitis B, infant should receive HBIG as soon as possible and no later than 7 days old
- All pregnant women should be tested for Hepatitis B during an early prenatal visit with every pregnancy

Influenza

Arizona Seasonal Influenza/RSV Surveillance Update

- Local flu activity reported for Week 14 (April 5, 2015 – April 11, 2015)
- A total of 11,596 influenza cases have been reported from all 15 counties during the 2014-2015 season
- The majority of influenza this season has been influenza A
 - Of those subtyped, the majority has been influenza A (H3)
 - Three pediatric death have been reported in 2014-15 season
- A total of 5,172 RSV cases have been reported from 15 counties during the 2014-2015 season
- ADHS Flu/RSV Activity Reports available at:
<http://www.azdhs.gov/phs/oids/epi/flu/index.htm>

Influenza H7N9 Update

- As of 4/7/2015, there have been 640 cases and 227 deaths
 - Cases reported in China, Malaysia, Taiwan and Canada
 - All cases reported recent travel to China
- Most infection occurring in middle aged and older men
- Transmission is believed to be due to having contact with poultry (approx. 80% of cases report recent exposure)
 - No sustained human-to-human transmission
- The virus is susceptible to oseltamivir and zanamivir
- CDC is taking the earliest steps needed to develop a candidate vaccine

Arizona Infectious Disease Conference

July 21-23, 2015

- Topics: VPDs, Healthcare-Associated Infections, Influenza, Refugee Health, Vector-borne and Zoonotic Diseases, TB, HIV, STDs, and more
- Cost: Free!
- Disease Outbreak Tabletop Exercise
- More information:
<http://www.azdhs.gov/phs/oids/training/2015-training.htm>

ADHS VPD Surveillance Staff

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Contact: 602-364-3676

Questions?

Thank you!